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Table 1 Synthesis Matrix

	Author and Year	Aim	Geographical Location	Participants	Setting	Main findings
1	Chu et al[60]	To design and develop user-centred and evidence-based exergaming system for use among older adults in LTC home.	Canada	28 general LTC population participants	LTC setting	A participatory design was successful in increasing acceptability, useability and enjoyment for LTC residents. Exergames have the potential to improve the physical health and social engagement of older adults in LTC.
2	D'Cunha et al[50]	To examine the use of virtual cycling for people with cognitive impairment in residential aged care facilitates.	Australia	10 participants with cognitive impairment	Residential aged care facilitates	The findings of this study were overall positive and support the use of the virtual cycling experience as an immersive and engaging alterative to usual activities.
3	Eisapour et al[45]	To increase accessibility to exercise for people living with dementia through the creation of two virtual reality (VR) environments.	Canada	6 participants with dementia	LTC setting	Participants successfully engaged with the VR environments and high levels of satisfaction were recorded.
4	Eisapour et al[49]	To investigate whether playing games and interacting with virtual objects in VR could be a comparable alternative to (human) therapist-led exercise for people living with dementia.	Canada	6 participants with dementia	LTC setting	Participants' subjective responses, motion, and fitness parameters all demonstrated comparable results between virtual reality and human-guided exercises.
5	Gunst et al[53]	To improve the quality of life in nursing homes and investigate the effect of exergames on general wellbeing and social interaction.	Belgium	35 general LTC population participants	Residential care centre	Exergaming is a feasible and pleasant complement to the usual activities within residential care centre. It was shown to have a positive impact on wellbeing, sleep, pain and perceived cognition.
6	Li & Li[48]	To analyse the effect and music and art combined with Kinect game therapy as a special care on improving cognitive function and alleviating negative emotions.	China	100 participants with Alzheimer's Dementia	Residential aged care facility	The combined music and art therapy with Kinect game therapy in elderly institutions can effectively enhance the neurological and cognitive functions, improve the sleep and quality of life, and alleviate negative emotions for people with Alzheimer's Disease.

7	Matsangidou et al[46]	To evaluate the deployment of VR systems into restricted health care units by comparing the effectiveness against the conventional routine training of persons with dementia.	Cyprus	20 participants with mild – severe dementia	Dementia inpatient hospital	VR is effective in improving accuracy during exercise and emotional behaviour for people living with dementia.
8	Matsangidou et al[55]	To present the cyclic process of prototyping, testing, analysing and refining VR system in real-world clinical settings supporting people with dementia.	Cyprus	7 participants with moderate to severe dementia	Dementia inpatient hospital	The results of this study provide evidence that VR can play a significant role in the improvement of the physical training and emotional health of people with dementia, when it is appropriately designed.
9	Ofosu et al[21]	To study multidimensional health outcomes of digital physical activity (PA) intervention	Scotland	49 general LTC population participants	10 x care home	Improvements were reported in mood, physical health and social support for residents and job satisfaction for staff.
10	Padala et al[56]	To determine the effects on balance and gait of a Wii-Fit program compared to a walking program in subjects with mild Alzheimer's dementia (AD)	United States of America	22 participants with dementia	Assisted living facility	Findings demonstrated the safety and efficacy of Wii-Fit in an assisted living facility in subjects with mild AD.
11	Ramnath et al[58]	To compare effects of 12-week active video gaming intervention (x Box Kinect Sports) to conventional multimodal supervised exercise on fitness, functional ability and cognitive performance in older adults with memory complaints.	South Africa	45 participants with memory complaints	LTC setting	Improvements were seen in functional abilities. The interactive video gaming intervention group was more effective in improving executive and global cognition compared to the conventional multimodal exercise group.
12	Swinnen et al[54]	To explore the efficacy of exergaming in people with Major Neurocognitive Disorder (MNCD) residing in LTC facilities.	Belgium	55 participants with dementia	LTC setting	The exergaming intervention groups showed improvements in improved lower extremity functioning, cognitive function and step reaction time. Additionally, symptoms of depression were seen to reduce.
13	Swinnen et al[51]	To investigate the usability of stepping exergame in older adults with MNCD residing in an LTC facility.	Belgium	22 participants with dementia	LTC setting	The exergames were well accepted and the participants experienced enjoyment whilst engaging with them.

14	Swinnen et al[19]	To investigate the experiences of participation in a standing balance exergame program amongst people with MNCD within residential care settings.	Belgium	31 participants with dementia	2 x residential care settings	Results indicated that standing balance exergaming is feasible, beneficial, and engaging in people with MNCD. Positive impacts on physical health and wellbeing were highlighted.
15	Tobiasson et al[57]	To understand the impact of exercise games (exergames) on wellbeing in dementia special care units.	Sweden	22 participants with dementia	Inpatient unit for people with dementia	The results indicate that the notions of games/competition, social interaction and physical activity are valuable ingredients when designing interventions for the well-being of older people who suffer from moderate to severe dementia.
16	Ulbercht et al[59]	To evaluate how many nursing home residents with dementia would accept the accelerometer-based exergames.	Germany	79 participants 51.8% showed cognitive impairment indicative of dementia	3 x nursing homes	Participants who accepted the exergames were younger and less cognitively impaired.
17	Yamaguchi et al[52]	Indirectly improve residents' cognitive function by enhancing motivation using enjoyable video-sports games in group settings.	Japan	9 participants with mild – moderate dementia	Nursing home	Playing video-sports games in groups can be effective in improving the cognitive function of people with dementia.
18	Zheng et al[47]	To evaluation the effectiveness of active game play on cognition, quality of life, and depression for older people with dementia.	China	38 participants with dementia	Retirement community – LTC settings and day centres	The study found that active game play was effective in improving quality of life and alleviating depression in older adults with dementia, however no significant improvements were found regarding cognition.

Table 2 Overview of Thematic Matrix

Theme	Representative Studies
Wellbeing and Quality of Life Impacts	D'Cunha et al[50]; Eisapour et al[45]; Eisapour et al[49]; Gunst et al[53]; Li & Li[48]; Matsangidou et al[46]; Matsangidou et al[55]; Ofosu et al[21]; Swinnen et al[54]; Swinnen et al[51]; Swinnen et al[19]; Yamaguchi et al[52]; Zheng et al[47]
Physical Health Impacts	D'Cunha et al[60]; Eisapour et al[49]; Gunst et al[53]; Li & Li[48]; Matsangidou et al[46]; Matsangidou[55]; Ofosu et al[21]; Ramnath et al[58]; Swinnen et al[54]; Swinnen et al[51]; Swinnen et al[19]; Tobiasson et al[57]
Cognitive Impacts	Gunst et al[53]; Li & Li[48]; Ramnath et al[58]; Swinnen et al[54]; Swinnen et al[51]; Swinnen et al[19]; Tobiasson et al[57]; Ulbercht et al[59]; Yamaguchi et al[52]; Zheng et al[47]
Social Impacts	Chu et al[60]; D'Cunha et al[50]; Gunst et al[53]; Matsangidou et al[46]; Ofosu et al[21]; Swinnen et al[19]; Tobiasson et al[57]; Yamaguchi et al[52]; Zheng et al[47]
Person-centred Approaches	Chu et al[60] D'Cunha et al[50]; Eisapour et al[45]; Eisapour et al[49]; Gunst et al[53]; Matsangidou et al[46]; Matsangidou et al[55]; Padala et al[56]; Swinnen et al[51]; Swinnen et al[19]; Tobiasson et al[57]; Ulbercht et al[59]
Barriers and Feasibility	Chu et al[60]; D'Cunha et al[50]; Eisapour et al[45]; Eisapour et al[49]; Gunst et al[53]; Matsangidou et al[46]; Matsangidou et al[55]; Ofosu et al[21]; Ramnath et al[58]; Swinnen et al[54]; Swinnen et al[51]; Swinnen et al[19]; Ulbercht et al[59]